PATENT
Attorney Docket No. 63131

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: MICHAELI ET AL.
Application No. 09/845,606 Group Art Unit: 2194
Confirmation No. 2587
Filed: April 28, 2001 Examiner: ZHEN, Li B

For: METHOD AND APPARATUS FOR A DATA STRUCTURE COMPRISING A HIERARCHY OF QUEUES OR LINKED LIST DATA STRUCTURES

APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

On May 19, 2008, Appellant appealed from the final Office action mailed December 20, 2007. Appellant submits this Appeal Brief with the fee for submitting this Appeal Brief being provided via EFS-Web. Appellant has further submitted a petition for an extension of time. Appellant further authorizes the Commissioner to charge Deposit Account No. 501430 with any additional fees due in connection with the submission of this paper, and petitions for any additional extension of time which may be deemed necessary.

Moreover, all pending claims are supported by the originally filed disclosure, recite patentable subject matter, and the prior art of record neither teaches nor suggests all the elements/limitations of any pending claim. Therefore, all pending claims are believed to be allowable, and the application is considered in good and proper form for allowance. Appellant respectfully requests all claim rejections be reversed and all claims be allowed. Additionally, Appellant requests the Office withdraw all rejections and/or objections and allow the case in response to this reply to the final Office action

(i) REAL PARTY IN INTEREST

The above-identified application has been assigned to Cisco Technology, Inc. by inventors Amir Michaeli and Vitaly Sukonik, with this assignment recorded in the USPTO at Reel 011754, Frame 0868, with a recordation date of April 27, 2001.

(ii) RELATED APPEALS AND INTERFERENCES

None.

(iii) STATUS OF CLAIMS

Claims 1-3, 13-15, 23, 29-43, and 48-51 are pending in the application.

Claims 4-12, 16-22, 24-28, and 44-47 stand as canceled.

No claims stand as objected to.

All pending claims, Claims 1-3, 13-15, 23, 29-43, and 48-51, stand as rejected.

All pending claims, Claims 1-3, 13-15, 23, 29-43, and 48-51, are on appeal in the application.

(iv) STATUS OF AMENDMENT

NONE.

(v) SUMMARY OF CLAIMED SUBJECT MATTER

There are five pending independent claims on appeal, claims 1, 13, 23, 33, and 48, directed to methods and apparatus related to a data structure including a hierarchy of queues or linked list data structures. There are many embodiments described in the extensive specification and illustrated in the large number of figures, and only one or some of these embodiments is/are described herein in relation to each independent claim on appeal as required by the Rules.

Independent claim 1 claims a line card including a queue. One embodiment of such a queue is shown in FIG. 1B, and described at least from page 6, line 27 to page 7, line 10. The queue comprises a distributor (121); one or more storage elements (122, 123) for storing a data structure, the data structure including a plurality of sub-data structures with each of said sub-data structures capable of storing a plurality of stored items of a plurality of items; and a receiver. As described at least on page 7, lines 1-10, the distributor is configured to distribute the plurality of items to be added to the data structure among the plurality of sub-data structures in a predetermined sequence order defined among the plurality of sub-data structures and including each of the plurality of sub-data structures; and the receiver is configured to receive the items from the plurality of sub-data structures in the sequence order such that the plurality of items are received by the receiver from the data structure in a first-in the data structure, first-out the data structure order. This enqueuing and dequeuing of items is further described in relation to FIGs. 1C and 1D, and at least on page 7, lines 11-26.

Independent claim 13 claims a line card including a queue. One embodiment of such a queue is shown in FIG. 1A, and described at least on page 6, lines 3-26. The queue comprises one or more storage elements for storing a plurality of data structures (102-109), each of the plurality of data structures including a plurality of sub-data structures capable of storing a plurality of stored pieces of a plurality of pieces of information; a storage selector configured to select among the plurality of data structures for a particular piece of the plurality of pieces of information; a distributor (101); and a receiver (110). As described at least on page 6, lines 16-26, the distributor is configured to distribute each of the plurality of pieces of the information to be added to a particular one of the plurality of data structures across the plurality of sub-data structures belonging to the particular one of the plurality of data structures in a predetermined sequence order defined across the plurality of sub-data structures and including each of the plurality of sub-data structures; and the receiver is configured to receive the items from the plurality of sub-data structures in the sequence order such that the plurality of pieces of information are received by the receiver from the particular one of the

plurality of data structures in a first-in the particular one of the plurality of data structures, first-out the particular one of the plurality of data structures order.

Independent claim 23 claims a method performed by a single appliance. One embodiment is described in relation to FIGs. 1C and 1D, and at least on page 7, lines 11-26. This method comprises: (a) receiving a particular piece of information of a stream of pieces of information to be added to a queue, the queue including a plurality of sub-queues with each of capable of storing a plurality of pieces of information in the stream of pieces of information (process block 164); (b) adding the particular piece of information to a currently selected one of the plurality of sub-queues to which to add information (process block 166); (c) advancing the currently selected one of the plurality of sub-queues to which to add information to a next one of the plurality of the sub-queues to which to add information in a predetermined order among the plurality of sub-queues independent of the stream of information (process block 168); (d) removing information from a currently selected one of the plurality of sub-queues to which to remove information (process block 184); and (e) advancing the currently selected one of the plurality of sub-queues to which to remove information to a next one of the plurality of sub-queues to which to remove information in the predetermined order (process block 186). As illustrated by the looping of the flow diagrams of FIGs. 1C and 1D, these steps (a)-(c) are repeatedly performed to add information to the queue and steps (d)-(e) are repeatedly performed to remove information from the queue such that pieces of information of the stream of pieces of information are added to queue and removed from the queue in the same order.

Independent claim 33 claims a queue for storing items of a stream of information with said items received in a particular order, the queue being implemented by a single apparatus. One embodiment of such a queue is shown in FIG. 1B, and described at least from page 6, line 27 to page 7, line 10. The claimed queue comprises: a plurality of sub-queues, each of the plurality of sub-queues capable of storing a plurality of items (122, 123); an enqueue distributor configured to receive said items of the stream of information in said particular

order, and configured to distribute said items to the plurality of sub-queues in a predetermined sequence order among the plurality of sub-queues such that each of said items are only stored in a single one of the plurality of sub-queues (121); and a dequeue receiver configured to only receive said items of the stream of information from the plurality of queues in the predetermined sequence order and to forward said items in said particular order (124).

Independent claim 48 claims a queue for storing items of a stream of information with said items received in a particular order, the queue being implemented by a single apparatus. One embodiment of such a queue is shown in FIG. 1B, and described at least from page 6, line 27 to page 7, line 10. The queue comprises a plurality of sub-queues, each of the plurality of sub-queues capable of storing a plurality of items (labels 122, 123, page 6, line 27 to page 7, line 1); means for receiving said items of the stream of information in said particular order, and for distributing said items to the plurality of sub-queues in a predetermined sequence order among the plurality of sub-queues such that each of said items are only stored in a single one of the plurality of sub-queues, wherein items distributed to a sub-queue are stored in the sub-queue (enqueue distributor 121, page 7, lines 1-3); and means for retrieving said items of the stream of information from the plurality of queues in the predetermined sequence order and for forwarding said items in said particular order (dequeue receiver 124, page 7, lines 8-10).

(vi) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issues presented on appeal are listed below, and then addressed in corresponding subheadings hereinafter. Although there are additionally reasons that all claims are patentably distinct over the prior art of record, Appellants have elected solely for the purposes of this Appeal Brief to limit the issues to the issues listed below and discussed *infra*. Appellants respectfully request the Board reverse all rejection/objections.

(1) Whether claims 1-3, 13-15, 29-32, 35 and 37 are unpatentable under 35 USC § 102(e) as being anticipated by Gutierrez et al., US Patent 6,570,850.

(2) Whether claims 23, 33, 34, 36, 38-43 and 48-51 are unpatentable under 35 USC § 103(a) over Gutierrez et al., US Patent 6,570,850 in view of Parruck et al., US Patent 7,002,916.

(vii) ARGUMENT

(1) Whether claims 1-3, 13-15, 29-32, 35 and 37 are unpatentable under 35 USC § 102(e) as being anticipated by Gutierrez et al., US Patent 6,570,850.

Group: claims 1-3, 13-15, 29-32, 35 and 37

Representative claim for this group: claim 1.

It is well-established law that the burden is on the Office to initially present a *prima facie* unpatentability (e.g., anticipation, obvious) rejection, before Applicant has any burden of proof of disproving any application of a cited reference against a claim. *In re Warner*, 379 F2d. 1011, 1016, 154 USPA 173, 177 (C.C.P.A. 1967); Ex *parte Skinner*, 2 USPQ2d 1788, 1788-89 (B.P.A.I. 1986). The MPEP and law is clear that for anticipation, the reference *must teach each and every aspect of the claimed invention* either explicitly or impliedly, and the burden is on the Office to present a *prima facie* case of anticipation. MPEP § 706.02. Inherent means it *must* occur. The fact that a certain result or characteristic *may* occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. MPEP § 2112 (*emphasis in original*).

Claim 1 is directed to an embodiment of a queue in a line card of a router. The queue is implemented using multiple sub-data structures (e.g., queues / linked lists). Items are enqueued and dequeued in the same order (e.g., first-in, first-out). The claim recites a patentably distinct embodiment of the queue; that including using multiple sub-data structures (e.g., queues, linked lists) for storing this information. These items are distributed for storage among the multiple sub-data structures in a same predetermined sequence, and items are received by the receiver from the multiple sub-data structures in the same predetermined sequence, so that the order of items is maintained (e.g., first-in, first-out). For example, FIG 2A illustrates a queue implemented using *M* queues (203A to 203M). Queue selector 201 distributes the input items across the *M* queues in a predetermined sequence order, and queue

selector 231 receives the items from the *M* queues in the same sequence order so as to maintain/produce the first-in the data structure, first-out the data structure order.

The Office rejects claim 1 as being anticipated by Gutierrez et al., US Patent 6,570,850. Appellants respectfully traverse the rejections of these claims, as the Office fails to establish a *prima facie* case of anticipation. More specifically, the Office equates the claim limitation of the sub-data structure to Gutierrez et al.'s one entry of buffer BUF. Final Office action, mailed December 20, 2007, page 5, line 13. Claim 1 recites the limitation of "each of said sub-data structures capable of storing *a plurality of stored items*...." As admitted by the Office, each entry (BUF(B)) can store only "one cell" *Id.* at line 15; *see,* Gutierrez et al., col. 22, lines 5-6. For at least this reason, the Office fails to establish its initial burden of presenting a *prima facie* rejection of the claim.

Furthermore, Gutierrez et al. does not operate as the embodiment recited in claim 1, nor teach all of its claim limitations. Gutierrez et al. uses Buffer Store 63 to implement multiple queues using an independent linked list for each virtual circuit. It fails to teach a single queue formed from multiple sub-data structures as recited in the claim. It fails to teach that items are added to the data structure (Buffer Store 63) among the plurality of sub-data structures in a predetermined order, and with these items received by a receiver in the same predetermined order. Gutierrez et al. as applied by the Office does not teach maintaining the predetermined sequence required of a first-in, first-out queue. Claim 1 recites the limitation of:

> "wherein the distributor is configured to distribute the plurality of items to be added to the data structure among the plurality of sub-data structures in a predetermined sequence order defined among the plurality of sub-data structures and including each of the plurality of sub-data structures; and the receiver is configured to receive the items from the plurality of sub-data structures in the sequence order such that the plurality of items are received by

the receiver from the data structure in a first-in the data structure, first-out the data structure order."

In other words, maintaining the predetermined sequence of a first-in, first-out queue, with this first-in, first-out queue made using multiple sub-data structures (e.g., queues).

In contrast, Gutierrez et al. teaches that "the arbiter 76 arbitrates among access requests by the input port controls 71 of the input ports 60(i) and the output port controls 72 of the input ports 61(i) as described above. In that operation, in one embodiment, the arbiter 76 generally provides that the input port controls 71 will have the higher priority, on a round-robin basis as among themselves, with the output port controls 72 having the lower priority, on a round-robin basis as among themselves." Gutierrez et al., col. 28, lines 41-48. Gutierrez et al neither teaches nor suggests maintaining the predetermined ordering of the packets written to, and read from a plurality of sub-data structures to maintain a first-in, first-out ordering. Remember, the purpose of Gutierrez et al. is device for switching cells in a network. Cells are received on multiple input ports, and transferred to the multiple output ports based on which virtual circuit the cell belongs.

A simple example might help to clarify this position. Suppose one input port has three virtual circuits associated with it as follows: VC-1 going to output port 1, VC-2 going to output port 2, and VC-3 going to output port 3. Three packets are received in the following order: A w/VC-3; B w/VC-2; and C w/VC-1. The cells are written into buffer store 63 in the order: A, B, C. However, a round-robin of output ports 1 then 2 then 3, will give output port 1 first access to buffer store 63 to read cell C, then output port 2 to read cell B, then output port 3 to read cell A. In other words, the cells are stored in buffer store 63 in the order of A, B, C, and removed in the order of C, B, A.

In other words, the predetermined order of storing cells depends on the arrival order, while reading from the memory depends on the destinations of the cells. This fails to teach a first-in, first-out ordering among data distributed among multiple sub-data structures. For at

least this reason, the Office fails to establish its initial burden of presenting a *prima facie* rejection of the claim.

Finally, the Office equates Gutierrez et al.'s output control 72 to the recited claim limitation of a receiver. Claim 1 recites that "the receiver is configured to receive the items from the plurality of sub-data structures." Output control 72 is just that, a control; it does not receive cells. For at least this reason, the Office fails to establish its initial burden of presenting a *prima facie* rejection of the claim.

For at least these reasons, Appellants respectfully request the rejections of claims 1-3, 13-15, 29-32, 35 and 37 be reversed.

Group: claims 2, 3, 14 and 15.

Representative claim for this group: claim 2.

Claim 2 recites the limitation of "wherein each of the sub-data structures includes a linked-list data structure configured for storing items of the plurality of stored items." The Office equates the claim limitation of the sub-data structure to Gutierrez et al.'s one entry of buffer BUF. Final Office action, mailed December 20, 2007, page 5, line 13. This is one entry of a linked list structure, not a linked-list data structure as recited in the claim. For at least this reason, the Office has failed to present a *prima facie* rejection of claim 2. For at least these reasons, Appellants respectfully request the rejections of claims 2, 3, 14 and 15 be reversed.

Group: claims 29, 30, 31 and 32.

Representative claim for this group: claim 29.

Claim 29 recites the limitation of "wherein the sequence order is a round robin order among the plurality of sub-data structures." As discussed *supra* in relation to claim 1, Gutierrez et al. teaches that the predetermined order of storing cells depends on the arrival order, while reading from the memory depends on the destinations of the cells. This fails to teach a first-in, first-out ordering among data distributed among multiple sub-data structures. More specifically, Gutierrez et al. neither teaches nor suggests that the sequence order (for writing to and reading from) is a round robin among the plurality of sub-data structures. For at least this reason, the Office has failed to present a *prima facie* rejection of claim 29. For at least these reasons, Appellants respectfully request the rejections of claims 29, 30, 31 and 32 be reversed.

Group: claims 35 and 37.

Representative claim for this group: claim 35.

Claim 35 recites the limitation of "wherein the distributor is configured to said distribute the plurality of items among the plurality of sub-data structures without regard to the content of items of the plurality of items." Gutierrez et al. teaches that the virtual circuit to which a cell belongs determines which of the linked lists of buffer store 63 to add the received cell. Gutierrez et al., col. 22, lines 1-19. For at least this reason, the Office has failed to present a *prima facie* rejection of claim 35. For at least these reasons, Appellants respectfully request the rejections of claims 35 and 37 be reversed.

(2) Whether claims 23, 33, 34, 36, 38-43 and 48-51 are unpatentable under 35 USC § 103(a) over Gutierrez et al., US Patent 6,570,850 in view of Parruck et al., US Patent 7,002,916.

Group: claims 36 and 38.

Representative claim for this group: claim 36.

Claim 36 depends from independent claim 1, discusses *supra.* The Office action does not address the limitations of independent claim 1, so it apparently relies on the statement of its rejection of claim 1 in the final Office action. Claim 36 recites the limitation of "wherein said items correspond to packets." For the purposes of this Appeal, Appellants concede that Gutierrez et al.'s use of the term "cell" can be used interchangeably with the term "packet." However, the Office equates the claim limitation of the sub-data structure to Gutierrez et al.'s one entry of buffer BUF. Final Office action, mailed December 20, 2007, page 5, line 13. Claim 36, via its independent claim 1, includes the limitation of "each of said sub-data structures capable of storing *a plurality of stored items*...." As admitted by the Office, each entry (BUF(B)) can store only "one cell" *Id.* at line 15; *see,* Gutierrez et al., col. 22, lines 5-6. For at least this reason, the Office fails to establish its initial burden of presenting a *prima facie* rejection of the claim, as the equated element of Gutierrez et al. cannot store a plurality of cells/packets/items. For at least these reasons, Appellants respectfully request the rejections of claims 36 and 38 be reversed.

Group: claims 23, 33, 34, 36, 38-43 and 48-51.

Representative claim for this group: claim 23.

It is well-established law that the burden is on the Office to initially present a *prima facie* unpatentability (e.g., anticipation, obvious) rejection, before Applicant has any burden of proof of disproving any application of a cited reference against a claim. *In re Warner*, 379 F2d. 1011, 1016, 154 USPA 173, 177 (C.C.P.A. 1967); Ex *parte Skinner*, 2 USPQ2d 1788, 1788-89 (B.P.A.I. 1986). The MPEP and law is clear that for anticipation, the reference *must teach each and every aspect of the claimed invention* either explicitly or impliedly, and the burden is on the Office to present a *prima facie* case of anticipation. MPEP § 706.02. Inherent means it *must* occur. The fact that a certain result or characteristic *may* occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. MPEP § 2112 (*emphasis in original*).

With all due respect, Appellants respectfully submit that the statement of the rejection for the combination of Gutierrez et al. with Parruck et al. is incoherent. The Office action at the top of page 14, states that Gutierrez et al fails to teach that the data structure and sub-data structures are queues and sub-queues. The Office action then proceeds to present details of Parruck et al. and in the statement for combination, apparently replaces most, if not all, of the features of Gutierrez et al. with those of Parruck et al. The Office action further states on page 4 that it is relying on Parruck et al. to teach queues and sub-queues, and not to include the features of packet shaping. Again, the statement of the rejection from the bottom of page 14 to the top of page 15 is to modify Gutierrez et al. to include the features (apparently from Parruck et al.) of "receiving a particular piece of information of a stream of pieces of information to be added to a queue, the queue including a plurality of sub-queues, add information in a predetermined order among the plurality of sub-queues, and removing information from a currently selected one of the plurality of sub-queues in the predetermined order because the queues provides a data structure for temporarily storing data packets in which the data packets are maintained in a First-In-First-Out order."

First, Appellants respectfully traverse the rejection as it fails to put Appellants on notice of the rejection. The Office action fails to state what of Gutierrez et al. it is replacing, and how. Moreover, the statement of combination is that Parruck et al. teaches a queue with sub-queues that maintain a first-in-first-out order. *Au contraire*, Parruck et al. teaches packet shaping which means that packets are reordered, and not retrieved from memory on a first-in-first-out basis. Parruck et al., abstract. Additionally, cells are added to queues based on the arrival of the traffic and based on where they came from. *Id.* They are not added to a queue in a pre-determined order. Additionally, the whole purpose of Parruck et al. is to change the order of the received packets, for example, based on weighting of data rates, etc. *Id.* For at least these reasons, Parruck et al. neither teaches nor suggests a first-in-first-out queue implemented using multiple sub-queues as stated in the Office action.

If the Office action is merely trying to use Parruck et al. to state that the linked lists for each of the virtual circuits are queues, Appellants admit for the purposes of this appeal that these linked lists are queues. The use of Gutierrez et al. is the same as presented against claim 1, and Appellants traverse the rejection of claim 23 for at least the reasons presented for claim 1.

For at least these reasons, Appellants respectfully request the rejections of claims 23, 33, 34, 36, 38-43 and 48-51 be reversed.

Group: claims 23, 33, 34, 39-43 and 48-51

Representative claim for this group: claim 23.

Applicants respectfully traverse the rejection of independent claim 23 as the Office fails to establish a *prima facie* case of obviousness. The use of Gutierrez et al. is the same as presented against claim 1, and Appellants traverse the rejection of claim 23 for at least the reasons presented for claim 1, with much of it repeated below.

The Office equates the claim limitation of the sub-data structure to Gutierrez et al.'s one entry of buffer BUF. Final Office action, mailed December 20, 2007, page 12, second paragraph. Claim 1 recites the limitation of " a plurality of sub-queues with each of *capable of storing a plurality of pieces of information* in the stream of pieces of information." As admitted by the Office, each entry (BUF(B)) can store only "one cell" *Id.*; *see,* Gutierrez et al., col. 22, lines 5-6. For at least this reason, the Office fails to establish its initial burden of presenting a *prima facie* rejection of the claim.

Furthermore, Gutierrez et al., alone or in combination with Parruck et al., does not operate as the embodiment recited in claim 23, nor teach all of its claim limitations. As relied upon by the Office in rejecting the claim, Gutierrez et al. uses Buffer Store 63 to implement multiple queues using an independent linked list for each virtual circuit. It fails to teach a single queue formed from multiple sub-queues as recited in the claim. It fails to teach that items are added to the data structure (Buffer Store 63) among the plurality of sub-queues structures in a predetermined order, and with these items removed from the plurality of sub-queues in the same predetermined order. Gutierrez et al., as applied by the Office does not teach maintaining the predetermined sequence required of a first-in, first-out queue. Claim 23 recites the limitation of:

> "repeatedly performing steps (a)-(c) to add information to the queue and steps (d)-(e) to remove information from the queue such that pieces of information

of the stream of pieces of information are added to queue and removed from the queue in the same order."

In other words, maintaining the predetermined sequence of a first-in, first-out queue, with this first-in, first-out queue made using multiple sub-queues (e.g., queues).

In contrast, Gutierrez et al. teaches that "the arbiter 76 arbitrates among access requests by the input port controls 71 of the input ports 60(i) and the output port controls 72 of the input ports 61(i) as described above. In that operation, in one embodiment, the arbiter 76 generally provides that the input port controls 71 will have the higher priority, on a round-robin basis as among themselves, with the output port controls 72 having the lower priority, on a round-robin basis as among themselves." Gutierrez et al., col. 28, lines 41-48. This neither teaches nor suggests maintaining the predetermined ordering of the packets written to, and read from a plurality of sub-data structures to maintain a first-in, first-out ordering. Remember, the purpose of Gutierrez et al. is device for switching cells in a network. Cells are received on multiple input ports, and transferred to the multiple output ports based on which virtual circuit the cell belongs.

A simple example might help to clarify this position. Suppose one input port has three virtual circuits associated with it as follows: VC-1 going to output port 1, VC-2 going to output port 2, and VC-3 going to output port 3. Three packets are received in the following order: A w/VC-3; B w/VC-2; and C w/VC-1. The cells are written into buffer store 63 in the order: A, B, C. However, a round-robin of output ports 1 then 2 then 3, will give output port 1 first access to buffer store 63 to read cell C, then output port 2 to read cell B, then output port 3 to read cell A. In other words, the cells are stored in buffer store 63 in the order of A, B, C, and removed in the order of C, B, A.

In other words, the predetermined order of storing cells depends on the arrival order, while reading from the memory depends on the destinations of the cells. This fails to teach a first-in, first-out ordering among data distributed among multiple sub-data structures. For at

least this reason, the Office fails to establish its initial burden of presenting a *prima facie* rejection of the claim.

Also, Parruck et al. neither teaches nor suggests a first-in-first-out queue implemented using multiple sub-queues as stated in the Office action, as discussed *supra*. It is directed at reordering traffic. Cells are added to queues based on the arrival of the traffic and based on where they came from. Parruck et al., abstract. Cells are not added to a queue in a pre-determined order. Additionally, the whole purpose of Parruck et al. is to change the order of the received packets, for example, based on weighting of data rates, etc. *Id.* For at least these reasons, Parruck et al. neither teaches nor suggests a first-in-first-out queue implemented using multiple sub-queues as stated in the Office action.

For at least these reasons, the prior art of record, alone or in combination, neither teaches nor suggests all of the claim limitations, and Appellants respectfully request the rejections of claims 23, 33, 34, 39-43 and 48-51 be reversed.

Group: claims 23, 43, 50 and 51.

Representative claim for this group: claim 23.

Claim 23 further includes the limitation of "advancing the currently selected one of the plurality of sub-queues to which to add information to a next one of the plurality of the sub-queues to which to add information in a predetermined order among the plurality of sub-queues *independent of the stream of information.*" (*Emphasis added*). Neither Gutierrez et al. nor Parruck et al. teaches this limitation. Gutierrez et al. adds packets to the buffer store based on the packets respective virtual circuit. Gutierrez et al., col. 22, lines 8-10. Parruck et al. adds packets to its queues based on what device the stream of packets is associated. Parruck et al., abstract. For at least this reason, the Office fails to establish a *prima facie* rejection. For at least these reasons, the prior art of record, alone or in combination, neither teaches nor suggests all of the claim limitations, and, Appellants respectfully request the rejections of claims 23, 43, 50 and 51 be reversed.

Group: claims 39, 41, 42, 51.

Representative claim for this group: claim 39.

Claim 39 recites the limitation of "wherein the predetermined order among the plurality of sub-queues is a round robin order among the plurality of sub-queues." As discussed *supra* in relation to claim 23, Gutierrez et al. teaches that the predetermined order of storing cells depends on the arrival order and on the arrival interface, while dequeuing cells depends on the destinations of the cells. Parruck et al. teaches that the predetermined order of storing cells depends on the arrival order and on their associated computer, while dequeuing depends on traffic shaping (packet reordering) parameters, such as weighting of data rates. For at least these reasons, the prior art of record, alone or in combination, neither teaches nor suggests all of the claim limitations, and Appellants respectfully request the rejections of claims 39, 41, 42 and 51 be reversed.

Group: claims 34, 40, and 49.

Representative claim for this group: claim 40.

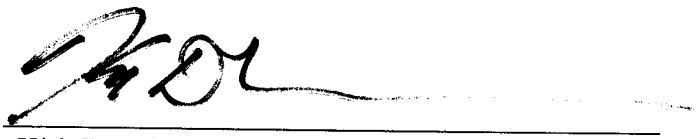
Claim 40 recites the limitation of "wherein said pieces of information correspond to packets." For the purposes of this Appeal, Appellants concede that Gutierrez et al.'s use of the term "cell" can be used interchangeably with the term "packet." However, the Office equates the claim limitation of the sub-data structure to Gutierrez et al.'s one entry of buffer BUF. Final Office action, mailed December 20, 2007, page 12, second paragraph. Claim 40, via its independent claim 23, includes the limitation of a plurality of sub-queues with each of capable of storing a plurality of pieces of information in the stream of pieces of information." As admitted by the Office, each entry (BUF(B)) can store only "one cell" *Id.*; *see,* Gutierrez et al., col. 22, lines 5-6. For at least this reason, the Office fails to establish its initial burden of presenting a *prima facie* rejection of the claim, as the equated element of Gutierrez et al. cannot store a plurality of cells/packets/items. For at least these reasons, the prior art of record, alone or in combination, neither teaches nor suggests all of the claim limitations, and, Appellants respectfully request the rejections of claims 34, 40 and 49 be reversed.

FINAL REMARKS. For at least these reasons, the prior art of record, alone or in combination, neither teaches nor suggests all of the claim limitations, and, Appellants respectfully request all rejections be reversed, all claims be allowed, and the application be passed to issuance.

All pending claims recite patentable subject matter, are supported by the originally filed disclosure, and the prior art of record neither teaches nor suggests all the elements/limitations of any pending claim. Therefore, all pending claims are believed to be allowable, and the application is considered in good and proper form for allowance. Appellants respectfully request all claim rejections be reversed and all claims be allowed. Additionally, Appellants request the Office withdraw all rejections and/or objections and allow the case in response to this reply to the final Office action.

Respectfully submitted,
The Law Office of Kirk D. Williams

Date: September 19, 2008

By 

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(viii) CLAIMS APPENDIX

1. A line card of a router including a queue, the queue comprising:

a distributor;

one or more storage elements for storing a data structure, the data structure including a plurality of sub-data structures with each of said sub-data structures capable of storing a plurality of stored items of a plurality of items; and

a receiver;

wherein the distributor is configured to distribute the plurality of items to be added to the data structure among the plurality of sub-data structures in a predetermined sequence order defined among the plurality of sub-data structures and including each of the plurality of sub-data structures; and the receiver is configured to receive the items from the plurality of sub-data structures in the sequence order such that the plurality of items are received by the receiver from the data structure in a first-in the data structure, first-out the data structure order.

2. The line card of claim 1, wherein each of the sub-data structures includes a linked-list data structure configured for storing items of the plurality of stored items.

3. The line card of claim 2, wherein the queue comprises a storage for storing a head and a tail of the linked list data structure of each of the plurality of sub-data structures.

13. A line card of a router including a queue, the queue comprising:

one or more storage elements for storing a plurality of data structures, each of the plurality of data structures including a plurality of sub-data structures capable of storing a plurality of stored pieces of a plurality of pieces of information;

a storage selector configured to select among the plurality of data structures for a particular piece of the plurality of pieces of information;

a distributor; and

a receiver;

wherein the distributor is configured to distribute each of the plurality of pieces of the information to be added to a particular one of the plurality of data structures across the plurality of sub-data structures belonging to the particular one of the plurality of data structures in a predetermined sequence order defined across the plurality of sub-data structures and including each of the plurality of sub-data structures; and the receiver is configured to receive the items from the plurality of sub-data structures in the sequence order such that the plurality of pieces of information are received by the receiver from the particular one of the plurality of data structures in a first-in the particular one of the plurality of data structures, first-out the particular one of the plurality of data structures order.

14. The line card of claim 13, wherein each of the sub-data structures includes a linked-list data structure configured for storing pieces of information of the plurality of pieces of information.

15. The line card of claim 14, wherein the queue comprises a storage for storing a head and a tail of the linked list data structure of each of the plurality of sub-data structures.

23. A method performed by a single appliance, the method comprising:

(a) receiving a particular piece of information of a stream of pieces of information to be added to a queue, the queue including a plurality of sub-queues with each of capable of storing a plurality of pieces of information in the stream of pieces of information;

(b) adding the particular piece of information to a currently selected one of the plurality of sub-queues to which to add information;

(c) advancing the currently selected one of the plurality of sub-queues to which to add information to a next one of the plurality of the sub-queues to which to add information in a predetermined order among the plurality of sub-queues independent of the stream of information;

(d) removing information from a currently selected one of the plurality of sub-queues to which to remove information;

(e) advancing the currently selected one of the plurality of sub-queues to which to remove information to a next one of the plurality of sub-queues to which to remove information in the predetermined order; and

repeatedly performing steps (a)-(c) to add information to the queue and steps (d)-(e) to remove information from the queue such that pieces of information of the stream of pieces of information are added to queue and removed from the queue in the same order.

29. The line card of claim 1, wherein the sequence order is a round robin order among the plurality of sub-data structures.

30. The line card of claim 29, wherein the distributor includes a counter configured to identify the sequence order.

31. The line card of claim 13, wherein the sequence order is a round robin order among the plurality of sub-data structures.

32. The line card of claim 31, wherein the distributor includes a counter configured to identify the sequence order.

33. A queue for storing items of a stream of information with said items received in a particular order, the queue being implemented by a single apparatus, the queue comprising:

a plurality of sub-queues, each of the plurality of sub-queues capable of storing a plurality of items;

an enqueue distributor configured to receive said items of the stream of information in said particular order, and configured to distribute said items to the plurality of sub-queues in a predetermined sequence order among the plurality of sub-queues such that each of said items are only stored in a single one of the plurality of sub-queues; and

a dequeue receiver configured to only receive said items of the stream of information from the plurality of queues in the predetermined sequence order and to forward said items in said particular order.

34. The queue of claim 33, wherein said items correspond to packets.

35. The line card of claim 1, wherein the distributor is configured to said distribute the plurality of items among the plurality of sub-data structures without regard to the content of items of the plurality of items.

36. The line card of claim 1, wherein said items correspond to packets.

37. The line card of claim 13, wherein the distributor is configured to said distribute the plurality of pieces of the information among the plurality of sub-data structures without regard to the content of piece of the plurality of pieces of the information.

38. The line card of claim 13, wherein said pieces of information correspond to packets.

39 (previously presented): The method of claim 23, wherein the predetermined order among the plurality of sub-queues is a round robin order among the plurality of sub-queues.

40 (previously presented): The method of claim 23, wherein said pieces of information correspond to packets.

41. The queue of claim 33, wherein the predetermined sequence order is a round robin order among the plurality of sub-queues.

42. The queue of claim 41, wherein the enqueue distributor includes a counter for use in identifying the predetermined sequence order.

43. The queue of claim 33, wherein the enqueue distributor is configured to said distribute the plurality of items among the plurality of sub-queues without regard to the content of items of the plurality of items.

48. A queue for storing items of a stream of information with said items received in a particular order, the queue being implemented by a single apparatus, the queue comprising:

a plurality of sub-queues, each of the plurality of sub-queues capable of storing a plurality of items;

means for receiving said items of the stream of information in said particular order, and for distributing said items to the plurality of sub-queues in a predetermined sequence order among the plurality of sub-queues such that each of said items are only stored in a single one of the plurality of sub-queues, wherein items distributed to a sub-queue are stored in the sub-queue; and

means for retrieving said items of the stream of information from the plurality of queues in the predetermined sequence order and for forwarding said items in said particular order.

49. The queue of claim 48, wherein said items correspond to packets.

50. The queue of claim 48, wherein the sequence order among the plurality of sub-queues is predetermined and independent of the content of said items of the stream of information.

51. The queue of claim 50, wherein the predetermined order is a round robin among the plurality of sub-queues.

(ix) EVIDENCE APPENDIX

NONE.

(x) RELATED PROCEEDINGS APPENDIX

NONE.